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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,085	02/13/2004	Hiroshi Matsunaga	396.43501X00	4120

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EXAMINER
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DELCOTTO, GREGORY R

ART UNIT	PAPER NUMBER
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1751

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/23/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/777,085

Applicant(s)

MATSUNAGA ET AL.

Examiner

Gregory R. Del Cotto

Art Unit

1751

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 2, 4-20, 22-40, 42, 43, 45 and 46 is/are pending in the application.
- 4a) Of the above claim(s) 19, 20, 39 and 40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-18, 22-38, 42, 43, 45 and 46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

Art Unit: 1751

### **DETAILED ACTION**

1. Claims 1, 2, 4-20, 22-40, 42, 43, 45, and 46 are pending. Claims 3, 21, 41, and 44 have been canceled. Applicant's arguments and amendments filed 4/5/07 have been entered.

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

However, this new action is being made final and includes a rejection of claims 42, 43, 45, and 46 which were inadvertently left out of the last Office action mailed on 10/5/06.

Claims 19, 20, 39, and 40 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 2/21/06.

### **Objections/Rejections Withdrawn**

The following objections/rejections set forth in the Office action mailed 10/5/06 have been withdrawn:

None.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 1751

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 4, 6, 7, 9-13, 15-18, 22, 24, 25, 27-38, 42, 43, 45, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gotoh et al (US 2002/006645).

Gotoh et al teach a cleaning method characterized by allowing a cleaning agent comprising an oxidizing agent, a chelating agent, and a fluorine compound to flow on a surface of a material to be treated at a high speed to thereby clean the surface. See Abstract. These surfaces include semiconductor devices and resists formed on such devices. See paras. 15 and 16. The oxidizing agent is used in amounts from 0.0001 to 60% by weight and includes hydrogen peroxide, ozone, etc. See para. 17. Suitable chelating agents include EDTA, metaphosphoric acid, oxalic acid, citric acid, catechol, pyrogallol, etc. The chelating agents can be used alone or in combination of two or more kinds thereof and may be present in amounts of 0.01 to 10% by weight. See

Art Unit: 1751

paras. 18-20. Note that, the Examiner asserts that compounds such as catechol and pyrogallol are conventionally known corrosion inhibiting agents.

Suitable fluorine compounds include ammonium fluoride, tetramethylammonium fluoride, etc., and the fluorine compounds may be used in amounts from 0.001 to 20% by weight of the composition. See para. 21. Solvents may also be used in amounts from 1 to 70% by weight. Additionally, the composition may be blended with other additives which have so far been used as long as the object of the invention is not damaged. Further a surfactant may be added and can include any cationic, nonionic, or anionic surfactant. The pH of the composition is in a range of 3 to 12. When the composition has an alkaline pH, a base such as tetramethylammonium hydroxide may be used. See paras. 22-26. A cleaning agent may be used for pre-cleaning or post-cleaning the substrate to be cleaned by using a solvent and surfactant. Suitable surfactants for this composition include a phosphoric acid ester ethoxylated surfactant. See paras 34-39. Note that, with respect to the ratio of acid to oxidant as recited by instant claims 3 and 21, the Examiner asserts that the teachings of Gotoh et al would suggest a ratio of acid to oxidant as recited by instant claims 3 and 21. Note that, water may be used as the balance of the composition. See para 58.

Gotoh et al are relied upon as set forth above. Note that, the Examiner asserts that one skilled in the art would be motivated to use an ethoxylated phosphoric acid ester surfactant in the main cleaning composition taught by Gotoh et al, with a reasonable expectation of success, because Gotoh et al teach the use of an anionic ethoxylated phosphoric acid ester surfactant in a pre-cleaning or post-cleaning step for

Art Unit: 1751

a semiconductor substrate and further, Gotoh et al teach that any anionic surfactant is suitable for the main cleaning composition.

Gotoh et al do not teach, with sufficient specificity, a cleaning composition having the specific pH containing an oxidizing agent, an acid, a fluorine compound, a corrosion inhibitor, surfactant, water, and the other requisite components of the composition in the specific amounts as recited by the instant claims.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to formulate a cleaning composition having the specific pH containing an oxidizing agent, an acid, a fluorine compound, a corrosion inhibitor, surfactant, water, and the other requisite components of the composition in the specific amounts as recited by the instant claims, with a reasonable expectation of success and similar results with respect to other disclosed components, because the broad teachings of Gotoh et al suggest a cleaning composition having the specific pH containing an oxidizing agent, an acid, a fluorine compound, a corrosion inhibitor, surfactant, water, and the other requisite components of the composition in the specific amounts as recited by the instant claims.

Claims 8 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gotoh et al (US 2002/0066465) as applied to claims 1, 2, 4, 6, 7, 9-13, 15-18, 22, 24, 25, and 27-38 above, and further in view of Skee (US 2002/0077259).

Gotoh et al are relied upon as set forth above. However, Gotoh do not teach the use of sulfuric acid in addition to the other requisite components of the composition as recited by the instant claims.

Skee teaches aqueous alkaline compositions useful in the microelectronics industry for stripping or cleaning microelectronics industry for stripping or cleaning semiconductor wafer substrates by removing photoresist residues and other unwanted contaminants. Suitable chelating or complexing agents include EDTA, citric acid, sulfuric acid, etc.

It would have been obvious to one of ordinary skill in the art at the time the invention was made, to use sulfuric acid in the composition taught by Gotoh et al, with a reasonable expectation of success, because Skee teaches the equivalence of sulfuric acid to citric acid in a similar composition and further, Gotoh et al teach the use of citric acid.

Claims 5 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gotoh et al (US 2002/0066465) as applied to claims 1, 2, 4, 6, 7, 9-13, 15-18, 22, 24, 25, and 27-38 above, and further in view of Kim et al (US 2004/0038839) or Matsuo et al (US 6,296,714).

With respect to Kim et al (US 2004/0038839), Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Gotoh et al are relied upon as set forth above. However, Gotoh do not teach the use of nitric acid in addition to the other requisite components of the composition as recited by the instant claims.

Kim et al teach organic stripping compositions and a method of etching a semiconductor device in which the generation of an Si pitting phenomenon can be



Art Unit: 1751

prevented. The method further includes supplying an organic stripping composition to remove residues including any residual organic material. See Abstract. The stripping compositions include an oxidizing agent such as nitric acid, hydrogen peroxide, etc. See paras. 39-41.

Matsuo et al teach a washing solution for a semiconductor substrate containing an organic acid and hydrofluoric acid. See Abstract. A second washing step includes washing the substrate in a solution containing an oxidizing agent such as hydrogen peroxide, nitric acid, etc. See claims 1-8.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use nitric acid in the composition taught by Gotoh et al, with a reasonable expectation of success, because Kim et al or Matsuo et al teach the equivalence of hydrogen peroxide to nitric acid as an oxidizing agent in similar compositions and further, Gotoh et al teach the use of hydrogen peroxide.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gotoh et al (US 2002/0066465) as applied to claims 1, 2, 4, 6, 7, 9-13, 15-18, 22, 24, 25, and 27-38 above, and further in view of Luo et al (US 6,524,168).

Gotoh et al are relied upon as set forth above. However, Gotoh do not teach the use of polyethyleneimine in addition to the other requisite components of the composition as recited by the instant claims.

Luo et al teach a polishing composition for chemical mechanical polishing of semiconductor devices of silica and circuits of aluminum, titanium, or titanium nitride wherein said aqueous composition includes an oxidizing agent, an inhibitor of

Art Unit: 1751

polyalkyleneimine, and a pH buffer. See Abstract. The polyethyleneimine inhibitor for an inhibitor layer or a passivation layer on a metal substrate such as aluminum and protects the substrate.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use polyethyleneimine in the composition taught by Gotoh et al, with a reasonable expectation of success, because Luo et al teach the use of polyethyleneimine as a corrosion inhibitor in a similar composition for semiconductor substrates and further, Gotoh et al teaches that additives may be included in the composition which would encompass various corrosion inhibitors.

### ***Response to Arguments***

With respect to Gotoh et al, Applicant once again states that Gotoh et al does not teach or suggest a cleaning solution having a ratio of acid to oxidizing within the range as recited by the instant claims. In response, note that, the teachings of a reference are not limited to the preferred embodiments and the Examiner maintains, as stated previously, that the broad teachings of Gotoh et al would suggest compositions having the same ratio of acid to oxidizing agent as recited by the instant claims.

Additionally, Applicant once again states that evidence has been provided in the instant specification which shows the unexpected and superior properties of the claimed invention in comparison to compositions falling outside the scope of the instant claims. Specifically, Applicant states that on pages 17-21 of the instant specification, data has been presented which shows the unexpected and superior removal properties of the claimed invention in comparison to compositions, Specifically Comparative Example 2,

Art Unit: 1751

falling outside the scope of the instant claims. In response, note that, the Examiner assert that this data is not sufficient to overcome the prima facie case of obviousness set forth above; the data is still not commensurate in scope with the claimed invention in that the instant claims recited broad categories such as "oxidizing agent" and "an acid" with no proportions while the data is not commensurate in scope with this claim terminology. For example, the data presents no showing with respect to an oxidizing agent such as hydrogen peroxide as taught by Gotoh et al. Furthermore, Applicant has provided no data with respect to compositions having a ratio of acid to oxidizing agent greater than 40 while the instant claims recite a ratio as high as 100.

With respect to the rejections under 35 USC 103 using Gotoh et al in combination with Skee, Matsuo et al, Kim et al, or Luo et al, Applicant states that the secondary references as applied by the Examiner would not have rectified the deficiencies of Gotoh et al such that the presently claimed invention as a whole would have been obvious to one of ordinary skill in the art. In response, note that, as stated above, the Examiner maintains that Gotoh et al is sufficient to reject the claims under 35 USC 103. Skee, Matsuo et al, or Luo et al are secondary references relied upon for their teaching of sulfuric acid, nitric acid, and polyethyleneimine, respectively. The Examiner maintains that one of ordinary skill in the art would have clearly been motivated to use sulfuric acid in the composition taught by Gotoh et al, with a reasonable expectation of success, because Skee teaches the equivalence of sulfuric acid to citric acid in a similar composition and further, Gotoh et al teach the use of citric acid. Further, the Examiner maintains that one of ordinary skill in the art clearly would

Art Unit: 1751

have been motivated to use nitric acid in the composition taught by Gotoh et al, with a reasonable expectation of success, because Kim et al or Matsuo et al teach the equivalence of hydrogen peroxide to nitric acid as an oxidizing agent in similar compositions and further, Gotoh et al teach the use of hydrogen peroxide. Also, the Examiner maintains that one of ordinary skill in the art clearly would have been motivated to use polyethyleneimine in the composition taught by Gotoh et al, with a reasonable expectation of success, because Luo et al teach the use of polyethyleneimine as a corrosion inhibitor in a similar composition for semiconductor substrates and further, Gotoh et al teaches that additives may be included in the composition which would encompass various corrosion inhibitors.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Art Unit: 1751

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory R. Del Cotto whose telephone number is (571) 272-1312. The examiner can normally be reached on Mon. thru Fri. from 8:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on (571) 272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Gregory R. Del Cotto  
Primary Examiner  
Art Unit 1751

GRD  
April 20, 2007